

DPA53



True RMS 3-Phase voltage monitoring relay



Benefits

- **Wide voltage range.** Working in systems from 208 to 480 VAC.
- **Adjustable undervoltage level.** To allow a correct response to real alarm conditions.
- **Output and status LED indication.** For quick troubleshooting.
- **Regenerated voltage detection.** To detect phase loss even while the motor is running.
- **High Compactness.** 17.5 mm DIN-rail housing.

Description

DPA53 is a 3-phase mains monitoring relay. It operates on 3P systems, monitoring phase loss, phase sequence and undervoltage. Power supply provided by the monitored mains. For mounting on DIN-rail.

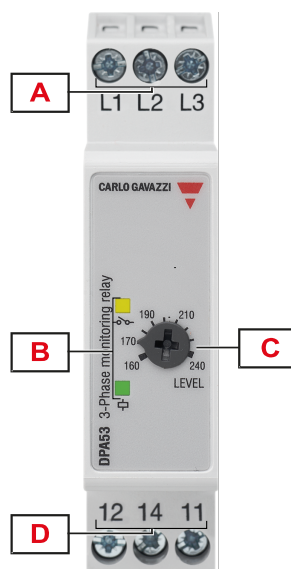
Main features

- Monitoring 3-phase mains with 3 wires (3P).
- Detection of the correct phase sequence and phase loss.
- Front dial adjustable undervoltage setpoints.
- Changeover relay output.

Order code

Mounting	Frequency	Power supply	Component name/part number
DIN-rail	50 - 60 Hz	208 to 240 VAC	DPA53CM23
	50 - 60 Hz	380 to 480 VAC	DPA53CM48

Structure



Element	Component	Function
A	Input terminals	Connection of the line voltages
B	Information LEDs	Yellow for relay output status Green for device ON
C	Voltage setpoint dial	Undervoltage setpoint adjustment
D	Output terminals	SPDT relay output

Features

Power supply

Power supply		Supplied by measured phases (L1, L3)
Overvoltage category		III (IEC 60664)
Voltage range	DPA53CM23	208 to 240 V _{L-L} AC ± 15% (177 to 276 V)
	DPA53CM48	380 to 480 V _{L-L} AC ± 15% (323 to 552 V)
Frequency range		50 to 60 Hz ±10% sinusoidal waveform
Consumption	DPA53CM23	< 7 VA
	DPA53CM48	< 13 VA

Inputs

Terminals	L1, L2, L3
Measured variables	Phase sequence
	Phase loss
	3P: voltages V _{L12} , V _{L23} , V _{L31}

Outputs

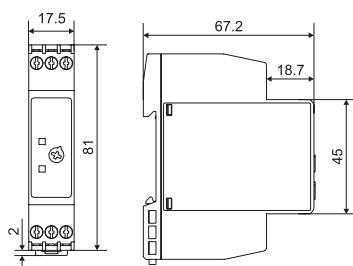
Terminals	11, 12, 14
Number of outputs	1
Type	SPDT electromechanical relay with changeover contacts
Logic	Output de-energised on alarm
Contact rating	I_{th} : 5 A @ 250 VAC AC15 : 2.5 A @ 250 VAC DC12 : 5 A @ 24 VDC DC13 : 2.5 A @ 24 VDC
Electrical lifetime	≥ 50 x 10 ³ operations (at 5 A, 250 V, cos φ= 1)
Mechanical lifetime	> 30 x 10 ⁶ operations
Assignment	Associated to all alarm types

Insulation

Terminals	Basic insulation
Inputs: L1, L2, L3 to output: 11, 12, 14	2.5 kVrms, 4 kV impulse 1.2/50 μs

General

Material	Polyamide (Nylon) (PA66/6) or Phenylene ether + Polystyrene (PPE-PS)
	Flammability rating: HB according to UL 94
Colour	RAL7035 (light grey)
Dimensions (W x H x D)	17.5 x 81 x 67.2 mm (0.68 x 3.19 x 2.65 in)
Weight	75 g (2.65 oz)
Terminals	Cable size from 0.05 to 2.5 mm ² (AWG30 to AWG13), stranded or solid
Tightening torque	Max. 0.5 Nm (4.425 lbin)
Terminal type	Screw terminals



Environmental

Operating temperature	50 Hz: -20 to 60 °C (-4 to 140 °F)
	60 Hz: -20 to 50 °C (-4 to 122 °F)
Storage temperature	-30 to 80 °C (-22 to 176 °F)
Relative humidity	5 - 95% non condensing
Protection degree	IP20
Pollution degree	2
Operating max altitude	2000 m amsl (6560 ft)
Salinity	Non saline environment
UV resistance	No

Vibration/Shock resistance







Test condition	Test	Level
Tests with unpacked device	Vibration response (IEC60255-21-1)	Class 1
	Vibration endurance (IEC 60255-21-1)	Class 1
	Shock (IEC 60255-21-2)	Class 1
	Bump (IEC 60255-21-2)	Class 1

Test condition	Test	Level
Tests with packed device	Vibration random (IEC60068-2-64)	Class 1
	Shock (IEC 60255-21-2)	Class 1
	Bump (IEC 60255-21-2)	Class 1

Class 1: monitoring devices for normal use in power plants, substations and industrial plants and for normal transportation conditions.

The packaging type is designed and implemented in such manner that the severity class parameters will not be exceeded during transportation.

Compatibility and conformity

Marking	 
Directives	2014/35/EU (LVD - Low voltage) 2014/30/EU (EMC - Electromagnetic compatibility)
Standards	Insulation coordination: EN 60664-1 Immunity: EN61000-6-2 Emission: EN61000-6-3
Approvals	   

Operating description

Device configuration

The relay operates when all the phases are present, the phase sequence is correct and the phase-phase voltage levels are above the adjusted setpoint.

Undervoltage adjustment dial		
Typology	M23	Linear selection from 160 to 240 V
	M48	Linear selection from 320 to 480 V
Resolution	M23	10 V increase per notch
	M48	20 V increase per notch
Function	Undervoltage setpoint	

Alarms

Phase loss, incorrect phase sequence and undervoltage triggering cause immediate output relay de-energisation.

Phase loss alarm		
Input variables	L1-L2, L2-L3 and L3-L1	
Alarm setpoint	One phase \leq 85% of the rated value (regenerated voltage detection)	
Restore setpoint	All phases $>$ 85% of the rated value + Hysteresis	
Reaction time	Alarm ON : $<$ 100 ms Alarm OFF : $<$ 300 ms	
Hysteresis	M23	3% on full scale
	M48	4% on full scale
Delay ON	None	
Delay OFF	None	

Phase sequence alarm		
Input variables	Connection L1, L2, L3	
Reaction time	Alarm ON : $<$ 100 ms Alarm OFF : $<$ 300 ms	
Delay ON	None	
Delay OFF	None	

Undervoltage alarm		
Input variables	3P: voltages V_{L12} , V_{L23} , V_{L31}	
Reaction time	Alarm ON : $<$ 100 ms Alarm OFF : $<$ 300 ms	
Undervoltage setting range	M23	From 160 to 240 VAC
	M48	From 320 to 480 VAC
Repeatability	0.5% on full scale	
Hysteresis	M23	3% on full scale
	M48	4% on full scale
Delay ON	None	
Delay OFF	None	

Information LEDs

Colour	Status		Description
Green (\ominus)	Power supply	ON	Power supply ON
		OFF	Power supply OFF
Yellow (\ominus)	Relay output	ON	Energised
		OFF	De-energised

Operating diagram

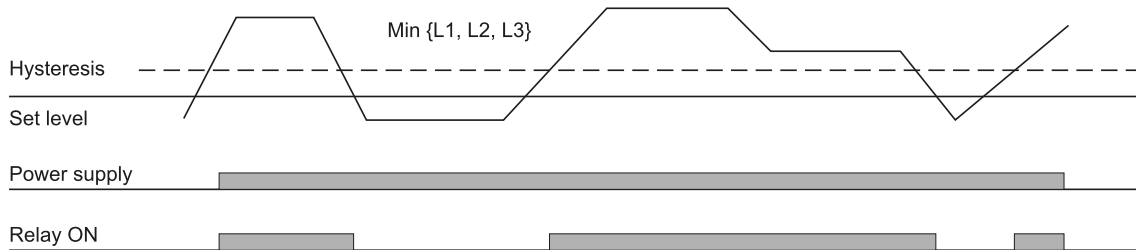


Fig. 1 Undervoltage monitoring

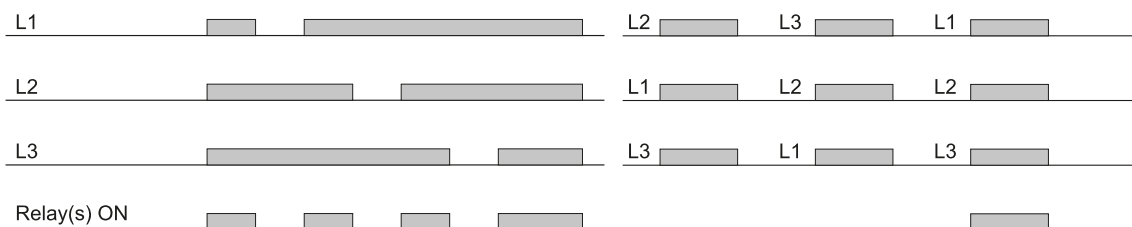
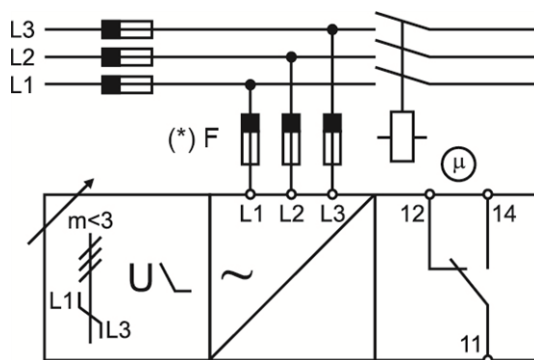


Fig. 2 Total phase loss, phase sequence


Connection diagram

(*) NOTE: fuses F of 315 mA delayed, if required by local law.



References

Further reading

Information	Where to find it	QR code
Installation manual	https://www.gavazziautomation.com/images/PIM/MANUALS/ENG/XPAX3_X5_IM.pdf	
PSS selection tool	https://carlogavazzi-pss.com/	



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